IN THE CLAIMS:

Please rewrite the following claims:

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1. (Previously Presented) A router for distributing packets in a network, wherein the packets originate at a source and are routed to a destination, comprising:

a plurality of route processing engines located within said router;

a mechanism that performs a hashing function on a destination address portion of a network layer in the packets transferred to the routing system, to produce an indicia of a flow and,

means for switching packets with a same said indicia of a flow to a single route processing engine of said plurality of route processing engines.

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2. (Previously Presented) The routing system of claim 1, further comprising:

at least one fast uplink connection to an external network to accept outgoing packets from a plurality of processing engines.

3. (Previously Presented) The routing system of claim 1, further comprising:

a crossbar as said means for switching packets.

4-8. (Previously Cancelled).

9. (Previously Presented) The routing system of claim 1, further comprising:

means for scaling processing power of said system by adding additional route processing engines to said plurality of route processing engines.

10. (Previously Cancelled).

11. (Previously Presented) A router for distributing packets in a network, wherein the packets originate at a source and are routed to a destination, comprising:

a plurality of network interfaces that transfer the packets to said destination and from said source;

a plurality of route processing engines located within said router;

a fabric interconnecting said plurality of network interfaces and said plurality of route processing engines;

a hashing function to hash a destination address of a packet to determine a distribution of the packets by said fabric, in response to an output of said hashing function, among said plurality of route processing engines.

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12. (Previously Presented) The routing system of claim 11, further comprising:

said fabric includes a crossbar.

13-14. (Previously Cancelled).

15. (Currently Amended) ~~The routing system of claim 11, further comprising:~~

A router for distributing packets in a network, wherein the packets originate at a source and are routed to a destination, comprising:

a plurality of network interfaces that transfer the packets to said destination and from said source;

a plurality of route processing engines located within said router;

a fabric interconnecting said plurality of network interfaces and said plurality of route processing engines;

a hashing function to hash a destination address of a packet to determine a distribution of the packets by said fabric, in response to an output of said hashing function, among said plurality of route processing engines; and

a port adapter, wherein the port adapter converts input data to a desired interface.

16. (Previously Presented) The routing system of claim 15, wherein said network interfaces include at least one uplink connection to an external network, wherein the port adapter converts input data to a known interface.

17. (Previously Presented) A method, in a router, for selecting one processing engine of a plurality of processing engines located within the router for processing at least one packet, the method comprising the steps of:

hashing a destination address portion of a network layer of at least one packet to determine a hash result, said hash result indicating a flow;

selecting one processing engine of said plurality of processing engines located within said router to process the flow indicated by said hash result.

18. (Previously Presented) The method of claim 17, further comprising:

the network layer information comprises one or more of the following network information: a network source address of the at least one packet, a network destination address of the at least one packet, a network destination address of the at least one packet, a source port of the at least one packet, and a protocol type value of the at least one packet.

19. (Previously Cancelled).

20. (Previously Presented) The method of claim 17, further comprising:

the hashing is computed by logically XORing an addresses, a port, and a protocol type value.

21. (Previously Presented) The method of claim 17, further comprising:

providing a table containing entries for use in selecting the one processing engine;

selecting one entry in the table specified by an index value, the index value based upon the hash value to select the processing engine for the hash value.

22. (Previously Cancelled).

23. (Currently Amended) The method of claim 17, further comprising:

distributing, in response to the hash function, the packets ~~evenly~~ among the plurality of processing engines.

24-25 (Previously Cancelled).

26. (Previously Presented) A system, in a router, for selecting one processing engine of a plurality of processing engines located within said router for processing at least one packet, the system comprising:

means for hashing a destination address of a network layer of the at least one packet to obtain a hash result; and

means, responsive to said hash result, for selecting said one processing engine of said plurality of processing engines located within said router to preserve a packet flow indicated by said destination address.

27. (Previously Presented) The system of claim 26 wherein the network layer flow information comprises:

at least one of a network source address of the at least one packet, a network destination address of the at least one packet, a source port of the at least one packet, a destination address of the at least one packet, and a protocol type value of the at least one packet.

28. (Previously Cancelled).

29. (Previously Presented) The system of claim 26, further comprising:

the hash value is computed by logically XORing the addresses, the ports, and the protocol type value.

30. (Previously Presented) The system of claim 26 further comprising:

means for providing a table containing entries for use in selecting the one processing engine; and

means, responsive to the hash value, for selecting one entry in the table.

31. (Previously Presented) The system of claim 26, further comprising:

the means for selecting carries out a hashing function that preserves the packet flow.

32. (Currently Amended) The system of claim 26, further comprising:

the at least one packet is one of a plurality of packets, and the means for selecting carries out a hashing function that causes the packets to be ~~mostly evenly~~ distributed among the processing engines.

33-43. (Previously Cancelled).

44. (Currently Amended) A routing system for distributing packets in a network, wherein the packets originate at a source and are returned to a destination, both source and destination external with respect to the routing system, comprising:

a plurality of network interfaces that transfer packets to a destination and from a source;

a plurality of route processing engines;

a hash mechanism that performs a hashing function on at least a portion of network layer information packet, in the packets transferred to the routing system, to determine a ~~an approximately even~~ distribution of the packets to the route processing engines for processing by the engines, and

a processing mechanism that determines packets belonging to a same flow and their original order from the network layer information of the packets, the network layer information including at least the same source/destination and protocol,

a data transferer that sends each ordered packet flow to a single route processing engine, thereby preserving the original ordered packet flows..

45. (Previously Presented) A router, comprising:
a plurality of processing engines located within said router for processing packets;
an interface for receiving a received packet from a network;
a data compiler to perform a hash function on a destination address of said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines located within said router in response to said hash result; and,
a switch to distribute said packet to said selected processing engine.

46. (Previously Presented) The router as in claim 45 further comprising:
said data compiler selection of said processing engine is partly table driven.

47. (Previously Presented) The router as in claim 45 further comprising:
said data compiler distributes the packets evenly among said plurality of processing engines.

48. (Previously Presented) The router as in claim 45 further comprising:
said data compiler distributes the packets evenly among said plurality of processing engines.

49. (Previously Presented) The router as in claim 45 further comprising:
said hash function uses a destination address information.

50. (Previously Presented) The router as in claim 45 further comprising:
said hash function uses a protocol information.

51. (Previously Presented) The router as in claim 45 further comprising:

said hash function uses a source port information.

52. (Previously Presented) A router, comprising:

a plurality of processing engines for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result; and,

a switch to distribute said packet to said selected processing engine; and

said data compiler determines an IP source address having source bytes and an IP destination address having destination bytes and a protocol byte, and performs said hash function by performing an exclusive OR (XOR) to said source bytes and said destination bytes and said protocol byte to generate said hash result as at least one output byte, said at least one output byte to designate a flow to which said received packet belongs, and routing all packets having the same flow to a selected processing engine.

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53. (Previously Presented) A router, comprising:

a plurality of processing engines for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result;

a switch to distribute said packet to said selected processing engine; and

said data compiler puts packets received from said network into packet digest form before transferring them to said switch.

54. (Previously Presented) The router as in claim 45, further comprising:

said switch receiving said received packet from said processing engine after said processing engine finishes processing said packet as a processed packet, and then said

switch routing said processed packet to an interface to transmit said processed packet out to said network.

55. (Currently Amended) ~~The router as in claim 45, further comprising:~~
A router, comprising:
a plurality of processing engines located within said router for processing packets;
an interface for receiving a received packet from a network;
a data compiler to perform a hash function on a destination address of said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines located within said router in response to said hash result;
a switch to distribute said packet to said selected processing engine; and
each processing engine of said plurality of processing engines ~~has~~ having a plurality of queues, said packet has classification information in a header, and said processing engine selects a queue of said plurality of queues in response to said classification information.

56. (Previously Presented) The router as in claim 55, further comprising:
said classification information indicates a priority of said packet.

57. (Previously Presented) The router as in claim 45, further comprising:
said processing engine performs routing of said packet.

58. (Previously Presented) The router as in claim 45, further comprising:
said processing engine performs tag application update on said packet.

59. (Previously Presented) The router as in claim 45, further comprising:
said processing engine performs filtering on said packet.

60. (Previously Presented) The router as in claim 45, further comprising:
said data compiler allocating said processing of packets to remaining processing engines in the event that a processor fails.

61. (Previously Presented) A router, comprising:
a plurality of processing engines for processing packets;
an interface for receiving a received packet from a network;
a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result;
a switch to distribute said packet to said selected processing engine;
said data compiler detecting that a particular packet requires specialized processing; and
said switch distributing said particular packet to a specialized processing engine to perform said specialized processing.

CONT I'

62. (Previously Presented) The router as in claim 61, further comprising:
said specialized processing is compression.

63. (Previously Presented) The router as in claim 61, further comprising:
said specialized processing is decompression.

64. (Previously Presented) The router as in claim 61, further comprising:
said specialized processing is encryption.

65. (Previously Presented) The router as in claim 61, further comprising:
said specialized processing is routing.

66. (Previously Presented) The router as in claim 45, further comprising:
said processing engine designates a high bandwidth uplink to receive said packet.

67. (Previously Presented) The router as in claim 45, further comprising:
said processing engine performs encryption on said packet.

68. (Previously Presented) The router as in claim 45, further comprising:
said processing engine performs decryption on said packet.

69. (Previously Presented) The router as in claim 45, further comprising:
said switch is a crossbar switch.

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70. (Previously Presented) A router, comprising:
a plurality of processing engines located within said router for processing packets;
an interface for receiving a received packet from a network;
means for performing a hash function calculation on a destination address of said received packet to produce a hash result; and,
means, responsive to said hash result, for switching said received packet to a processing engine selected from said plurality of processing engines located within said router for further processing of said received packet.

71. (Previously Presented) A method of processing packets in a router, comprising:
receiving a packet from a network;
performing a hash function calculation on a destination address of said packet to produce a hash result; and,
switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet.

72. (Previously Presented) The method as in claim 71, further comprising:
selecting a processing engine by using said hash result and a table.

73. (Currently Amended) The method as in claim 71, further comprising:
distributing the packets ~~evenly~~ among said plurality of processing engines.

74. (Previously Presented) The method as in claim 71 further comprising:
using a source address information in said hash function calculation.

75. (Previously Presented) The method as in claim 71 further comprising:
using a destination address information in said hash function calculation.

76. (Previously Presented) The method as in claim 71 further comprising:
using a protocol information in said hash function calculation.

77. (Previously Presented) The method as in claim 71 further comprising:
using a source port information in said hash function calculation.

78. (Previously Presented) A method of processing packets in a router, comprising:
receiving a packet from a network;
performing a hash function calculation on said packet to produce a hash result;
switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet; and
performing an exclusive OR (XOR) in response to a source address and a destination address and a protocol byte to generate said hash result as at least one output byte, said at least one output byte to designate a flow to which said received packet belongs, and routing all packets having the same flow to a selected processing engine.

79. (Currently Amended) ~~The method as in claim 71 further comprising:~~
A method of processing packets in a router, comprising:
receiving a packet from a network;
performing a hash function calculation on a destination address of said packet to produce a hash result;
switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet; and

allocating said packets to remaining processing engines in the event that a processing engine fails.

80. (Previously Presented) A method of processing packets in a router, comprising:
receiving a packet from a network;
performing a hash function calculation on said packet to produce a hash result;
switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet;
detecting that a particular packet requires specialized processing; and
distributing said particular packet to a specialized processing engine to perform said specialized processing.

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81. (Previously Presented) The method as in claim 80 further comprising:
processing compression as said specialized processing.

82. (Previously Presented) The method as in claim 80, further comprising:
processing decompression as said specialized processing.

83. (Previously Presented) The method as in claim 80, further comprising:
processing encryption as said specialized processing.

84. (Previously Presented) The method as in claim 80, further comprising:
processing routing as said specialized processing.

85. (Previously Presented) A router, comprising:
a plurality of processing engines located within said router for processing packets;
an interface for receiving a packet from a network, said packet referred to as a received packet;
a hashing function to perform a hash calculation on a destination address of said packet, said hash calculation producing a hash result;

a data compiler to determine a type of service required by said received packet; and,

a switch, responsive to said type of service and responsive to said hash result, to distribute said packet to a selected processing engine of said plurality of processing engines located within said router, said selected processing engine providing said type of service.

86. (Previously Presented) The apparatus as in claim 85 further comprising:
said type of service is compression.

87. (Previously Presented) The apparatus as in claim 85, further comprising:
said type of service is decompression.

88. (Previously Presented) The router as in claim 85, further comprising:
said type of service is encryption.

89. (Previously Presented) The router as in claim 85, further comprising:
said type of service is routing.

90. (Previously Presented) A method of processing packets in a router, comprising:
receiving a packet from a network, referred to as a received packet;
hashing a destination address of said received packet to obtain a hash result;
determining a type of service required by said received packet; and,
distributing, in response to said type of service and in response to said hash result, said received packet to a selected processing engine located within said router, said selected processing engine providing said type of service.

91. (Previously Presented) The method as in claim 90 further comprising:
processing compression as said type of service.

92. (Previously Presented) The router as in claim 90, further comprising:
processing decompression as said type of service.

93. (Previously Presented) The router as in claim 90, further comprising:
processing encryption as said type of service.

94. (Previously Presented) The router as in claim 90, further comprising:
processing routing as said type of service.

95. (Previously Presented) A computer readable media, comprising:
said computer readable media containing instructions for execution in a processor for the practice of the method of claim 17 or claim 71 or claim 90.

96. (Previously Presented) Electromagnetic signals propagating on a computer network, comprising:
said electromagnetic signals carrying instructions for execution on a processor for the practice of the method of claim 17 or claim 71 or claim 90.

97. (Previously Presented) A router for distributing packets in a network, the packets originate at a source and are routed to a destination, comprising:
a plurality of route processing engines located within said router;
a mechanism that performs a hashing function on at least a portion of network layer information in said packets, said information indicating said destination, said hashing function producing an indicia of a flow; and
a classification engine to switch packets with a same said indicia of a flow to a single route processing engine of said plurality of route processing engines.

98. (Currently Amended) ~~The apparatus of claim 97, further comprising:~~

A router for distributing packets in a network, the packets originate at a source and are routed to a destination, comprising:

a plurality of route processing engines located within said router;

a mechanism that performs a hashing function on at least a portion of network layer information in said packets, said information indicating said destination, said hashing function producing an indicia of a flow;

a classification engine to switch packets with a same said indicia of a flow to a single route processing engine of said plurality of route processing engines; and

said packets are a plurality of packets, individual packets of said plurality of packets arrive in substantially random order to produce different values of said information in random order, and said classification engine carries out a hashing function to produce said indicia of flow, and different values of said indicia of flow are in substantially random order in response to said plurality of packets arriving in random order, and a particular flow always produces a same indicia of flow, and said particular flow is assigned to a particular route processing engine in the order that a first packet of said particular flow first arrives at said router.

99. (Currently Amended) The apparatus of claim 98 further comprising:

said random order of arrival of said first packet of said particular flow leads to a ~~substantially uniform~~ distribution of packets being assigned to said route processing engines.

100. (Previously Presented) The router of claim 97, further comprising:

said information indicating said destination includes a destination address of said destination.

101. (Previously Presented) A method of operating a router, comprising:

receiving a packet by said router, said packet addressed to a destination, said router having a plurality of route processing engines;

hashing a portion of a network layer information of said packet, said information indicating said destination, to determine an indication of a flow:

selecting, in response to said indication of a flow, one processing engine of said plurality of processing engines to process the flow indicated.

102. (Currently Amended) ~~The method of claim 101, further comprising:~~

A method of operating a router, comprising:

receiving a packet by said router, said packet addressed to a destination, said router having a plurality of route processing engines;

hashing a portion of a network layer information of said packet, said information indicating said destination, to determine an indication of a flow:

selecting, in response to said indication of a flow, one processing engine of said plurality of processing engines to process the flow indicated;

said receiving step receives a plurality of packets, individual packets of said plurality of packets arrive in substantially random order to produce different values of said information in random order;

said hashing step produces different values of said indication of a flow in substantially random order in response to said plurality of packets arriving in random order;

producing by a particular flow a same indicia of flow; and

assigning said particular flow to a particular route processing engine in the order that a first packet of said particular flow first arrives at said router.

103. (Currently Amended) The method of claim 102 further comprising:

assigning, in response to said random order of arrival of said first packet of said particular flow, a ~~substantially uniform~~ distribution of packets to said route processing engines.

104. (Previously Presented) The method of claim 101, further comprising:

including in said information a destination address of said destination.

105. (Previously Presented) A router, comprising:

a port adapter to receive a packet by said router, said packet addressed to a destination, said router having a plurality of route processing engines;

means for hashing a portion of a network layer information of said packet, said information indicating said destination, to determine an indication of a flow:

means for selecting, in response to said indication of a flow, one processing engine of said plurality of processing engines to process the flow indicated.

106. (Currently Amended) ~~The apparatus of claim 105, further comprising:~~

A router, comprising:

a port adapter to receive a packet by said router, said packet addressed to a destination, said router having a plurality of route processing engines;

means for hashing a portion of a network layer information of said packet, said information indicating said destination, to determine an indication of a flow:

means for selecting, in response to said indication of a flow, one processing engine of said plurality of processing engines to process the flow indicated;

means for receiving a plurality of packets, individual packets of said plurality of packets arrive in substantially random order to produce different values of said information in random order;

means for producing different values of said indication of a flow in substantially random order in response to said plurality of packets arriving in random order;

means for producing by a particular flow a same indicia of flow; and

means for assigning said particular flow to a particular route processing engine in the order that a first packet of said particular flow first arrives at said router.

107. (Currently Amended) The apparatus of claim 106 further comprising:

means for assigning, in response to said random order of arrival of said first packet of said particular flow, a ~~substantially uniform~~ distribution of packets to said route processing engines.

108. (Previously Presented) The apparatus of claim 105, further comprising:

said information includes a destination address of said destination.

109. (Previously Presented) A computer readable media, comprising:

said computer readable media having instructions written thereon for execution on a processor for the practice of the method of claim 101.

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110. (Previously Presented) Electromagnetic signals propagating on a computer network, comprising:

said electromagnetic signals carrying instructions for execution on a processor for the practice of the method of claim 101.